

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)



Applicant's or agent's file reference 1945PTWO	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/EP99/04607	International filing date (day/month/year) 02/07/1999	Priority date (day/month/year) 02/07/1999
International Patent Classification (IPC) or national classification and IPC C10L1/32		
Applicant CONSORZIO INTERUNIVERSITARIO PER LO SVILUPPO et al		


1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 6 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

 These annexes consist of a total of 1 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 05/12/2000	Date of completion of this report 16.10.2001
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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/EP99/04607

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1-5 as originally filed

Claims, No.:

10-13 as originally filed

1-9 as received on 03/08/2001 with letter of 31/07/2001

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-13
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-13
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-13
	No:	Claims	

2. Citations and explanations
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

Re Item V

Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

- 1.) Reference is made to the following published documents:
D1: EP-A-0 893 488 (CANADA MAJESTY IN RIGHT OF) 27 January 1999 cited in the application
D2: WO 95 27021 A (GUNNERMAN RUDOLF W) 12 October 1995
- 2.) **Prior art**
 - 2.a) The document D1 is regarded as being the closest prior art to the subject-matter of independent claim 1, and discloses the following features thereof: a pyrolysis oil containing composition consisting of a W/O microemulsion of pyrolysis liquid in mineral (diesel) oil with at least one emulsifier. Its use as diesel engine fuel is also disclosed (Cf. D1: abstract, page 2 lines 35-36 and lines 49-51, page 3 lines 17-20, page 4 lines 9-11 and 41-43).
 - 2.b) The document D2 discloses a fuel comprising an O/W emulsion. The emulsion comprises water, a carbonaceous fuel, e.g. a biomass oil, C1 or C2 alcohol and an emulsifier. The use of pyrolysis oils is not clearly disclosed (Cf.D2: claim 1).
- 3.) **Novelty** (Art. 33(1)-(2)PCT).
 - 3.a) The invention is defined in claim 1 (Cf. Section VIII-1) as a fuel consisting of an emulsion of pyrolysis liquids and natural/mineral oils, excluding the microemulsions: the dispersed liquid is characterized as a phase and not as colloidal particles having dispersed a diameter of less than 10^{-8} m.
 - 3.b) The product of claim 1 of the application differs from the product disclosed in D1 in that the emulsions are not microemulsions (Cf. Item VIII-1,2).
 - 3.c) The product of claim 1 of the application differs from the product disclosed in D2 in that
 - the emulsions contain pyrolysis oils, and
 - the fuel do not contain C1-C2 alcohols.
 - 3.d) Therefore the subject-matter of claim 1 can be considered novel and thus it meets the requirements set forth in Art. 33(1)-(2)PCT.
- 4.) **Inventive step** (Art. 33(3)PCT).

The technical problem can be regarded as how to modify the fuels of D1 to make them more stable, less depending on temperature and with higher contents of water.

The solution to these problems seems to be in the use of emulsions, which are not microemulsions, i.e. with the particles of the dispersed liquid having a diameter larger than 10^{-8} m (=non colloidal): the fuels prepared according to the invention are reported to solve the problem posed and to have a higher **stability**.

The increased stability of the emulsions allows the preparation of emulsions with higher contents of pyrolysis liquids, i.e. higher water contents, thus offering an economical advantage for the use in internal combustion engines.

This effect seems to be achieved over the whole range, as defined by means of the disclaimer (Cf. Page 3 lines 17-19).

These problems and the advantages related to the invention are indicated in the description of the present application, e.g. at page 1 line 28-page 2 line 9 and at page 3 lines 14-19.

The available prior art does not fairly teach the formulation of "nonmicro-" emulsions of pyrolysis liquids and hydrocarbon oils.

Therefore the subject-matter of claim 1 can be considered to involve an inventive step and thus it meets the requirements set forth in Art. 33(3)PCT.

- 5.) The product claims 2-4, 6, 8, 10-12 depending on claim 1 fulfill the requirements of Art. 33(2)-(3) PCT.
- 6.) The claims 5, 7 and 9 for the manufacture and claim 13 for the use of a product being both new and non-obvious, fulfill the requirements of Art. 33(2)-(3) PCT.

Re Item VIII

Certain observations on the international application

- 1.) The disclaimer used by the Applicant in claim 1 seems to be admissible:
 - in the sense of Art. 6 PCT, since it defines clearly a subject-matter by excluding a precise feature: the microemulsions. According to the Ullmann's Encyclopaedia of Industrial Chemistry, V-Ed., Vol. A9 at page 298 the microemulsions are well defined as an isotropic liquid phase with a specific microstructure in which the

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particle diameter is less than 10^{-8} m.

- in the sense of Art. 34(2)(b) PCT, since the disclaimer is used to exclude a specific prior art (D1). Moreover the description says, at least implicitly, that the invention consists in the preparation of emulsions allowing to overcome the problems shown by the microemulsions.

- 2.) A disclaimer is used by the Applicant to exclude a specific prior art (D1). This practise is allowed in the PCT proceedings (PCT Gazette- Section IV Chapter III-4.12) and admissible in the EPC, but it could be unallowable in some national jurisdictions.

CLAIMS

- 1 1. Pyrolysis oil containing fuel consisting of an emulsions of pyrolysis liquids and
2 natural and/or mineral oils with emulsifiers and possibly co-emulsifiers capable of
3 forming oil-in-water, bicontinuous or water-in-oil emulsions, wherein the definition
4 emulsion does not include microemulsions.
- 1 2. Pyrolysis oil containing fuels according to Claim 1 wherein the emulsifiers are
2 chosen in the group consisting of:
3 - non-ionic block-copolymers (or homopolymers) surfactants having HLB from 4 to
4 18 possibly in combination with non ionic surfactants with HLB from 4 to 18
5 and
6 - anionic block-copolymers (or homopolymers) surfactants having HLB 4 to 18.
- 1 3. Pyrolysis oil containing fuel according to Claim 2 wherein the content in
2 surfactant is up to 3% by weight calculated on the total of the emulsion.
- 1 4. Pyrolysis oil containing fuels according to Claim 2 wherein the fuels is
2 represented by a water-in-oil emulsion presenting a biooil/mineral or natural oil
3 ratio of 1 - 45% (w/w).
- 1 5. Process for preparing a fuel according to claim 4 wherein a surfactant of the
2 first group indicated in Claim 2 is added to mineral or natural oil and thereafter the
3 biooil is added to the resulting mixture using a homogeniser.
- 1 6. Pyrolysis oil containing fuel according to Claim 2 wherein the fuel is represented
2 by a bicontinuous emulsion presenting a biooil/mineral or natural oil ratio of 45 -
3 55% (w/w).
- 1 7. Process for preparing a fuel according to claim 6 wherein a surfactant of the
2 first group indicated in Claim 2 is added to mineral or natural oil and to the biooil
3 and then mixing the resulting mixtures together using an homogeniser.
- 1 8. Pyrolysis oil containing fuel according to Claim 2 wherein the fuel is represented
2 by an oil-in-water emulsion presenting a biooil/mineral or natural oil ratio of 55 -
3 99% w/w.
- 1 9. Process for preparing fuel according to claim 8 wherein an emulsifier (which
2 can be chosen both in the first or the second of the above-described groups) is
3 added to the biooil and thereafter the natural or mineral oil is added to the
4 resulting mixture during emulsification.